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U. S. Department of Agriculture
Washington, D. C.

FM FOR YOU

By George Rowe, Office of Information

October 19, 1945

FM is a new short-wave, high frequency type of radio broadcast with these advantages:

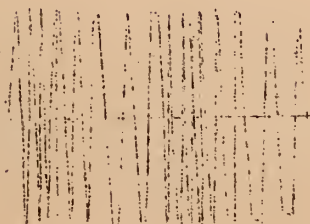
1. Clear reception. Virtually no static...or fading...or distortion...or interference among stations, day or night. Practically 100 percent noise-free. Full, brilliant, natural, life-like tone.
2. Economy. FM stations can be built and operated at moderate cost. New FM-AM combination receiving sets will soon be on the market.
3. Opportunity for better programs. Any program on FM will sound better than on the ordinary radio. In addition, FM will be strong in local appeal -- because of the range of an individual station is limited. At the same time, FM can offer network broadcasts too -- because programs can be effectively relayed. Competition for listeners will be keen because of the greater number of FM stations which can be licensed to broadcast.

The advantages of FM can never be surpassed by any possible future improvements in the ordinary type of radio. FM's superiority is due to its basic nature, and FM is a fundamentally different kind of broadcast.

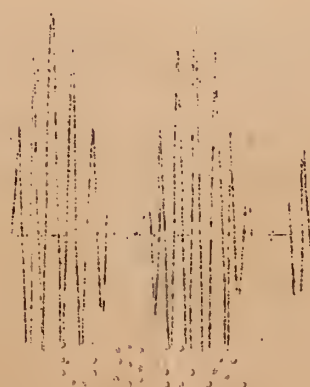
How FM Differs From Ordinary Radio

FM means "Frequency Modulation." The ordinary radio broadcast is called AM or "Amplitude Modulation."

The FM carrier wave is always the same power or "amplitude" but changes in "frequency" -- namely the number of cycles per second. Like this:



The AM carrier wave changes its "amplitude" but not its frequency. Like this:



Keep these two kinds of waves in mind and you can see why...

On FM, you hear all the sound from the station tuned in, you hear no sound overlapping from any other station, and your tone is perfectly clear, without interference.

On AM, however, you tune in only the middle part of the sound range, you do not hear all of the vibrations, the highs and lows, and there is a muffling of tone. Besides, the waves from other stations often overlap the one you tune in, and the result is interference, which is particularly bad at night.

Actually you hear only about $1/3$ of the original sound range on the average AM evening broadcast, while on FM you hear substantially all of it, all the time.

Another difference between FM and AM is that FM is a very high frequency broadcast while AM broadcasts are on the low frequencies.

FM's high frequencies are simply beyond the reach of most ordinary static, while AM broadcasts are in the same frequency range as many sound disturbances.

For clear reception, an AM broadcast signal must be about 100 times as strong as any disturbance or interference, but an FM signal needs to be only about 2 to 10 times as strong.

That's why FM is nearly 100 percent noiseless, while AM is constantly subject to static.

Another characteristic of FM is that its broadcasts fan out in almost straight lines, like rays of light. In contrast, AM broadcasts follow the curvature of the earth.

The result is that an FM station ordinarily reaches only about 100 miles in all directions (roughly 30,000 square miles), but within that range the reception is perfectly clear at all times.

A big AM station can reach out farther (how far depends on its power), but the farther out the sound waves go the more they are subject to fading, interference, static and other noise.

What counts is not how far the broadcast goes but how far it will give good reception -- good enough so that the average person will want to listen to it. From this standpoint, a good FM station (say 10,000 watts) will serve an area at least comparable to the satisfactory coverage of a "clear-channel" AM station as big as 50,000 watts. In general, suitable FM stations will give satisfactory service over bigger areas than "local" or "regional" AM stations.

How FM Networks Are Built

The limited range of an FM station can be overcome by relaying broadcasts so as to form networks. This can be done three ways:

1. By transmission wires. Existing telephone lines able to carry 15,000 cycles can be leased, or new lines can be strung up where needed.
2. By relay stations. A program can be beamed through relay stations, picked up by broadcast stations, and then rebroadcast. Relays can carry a program clear across the country.

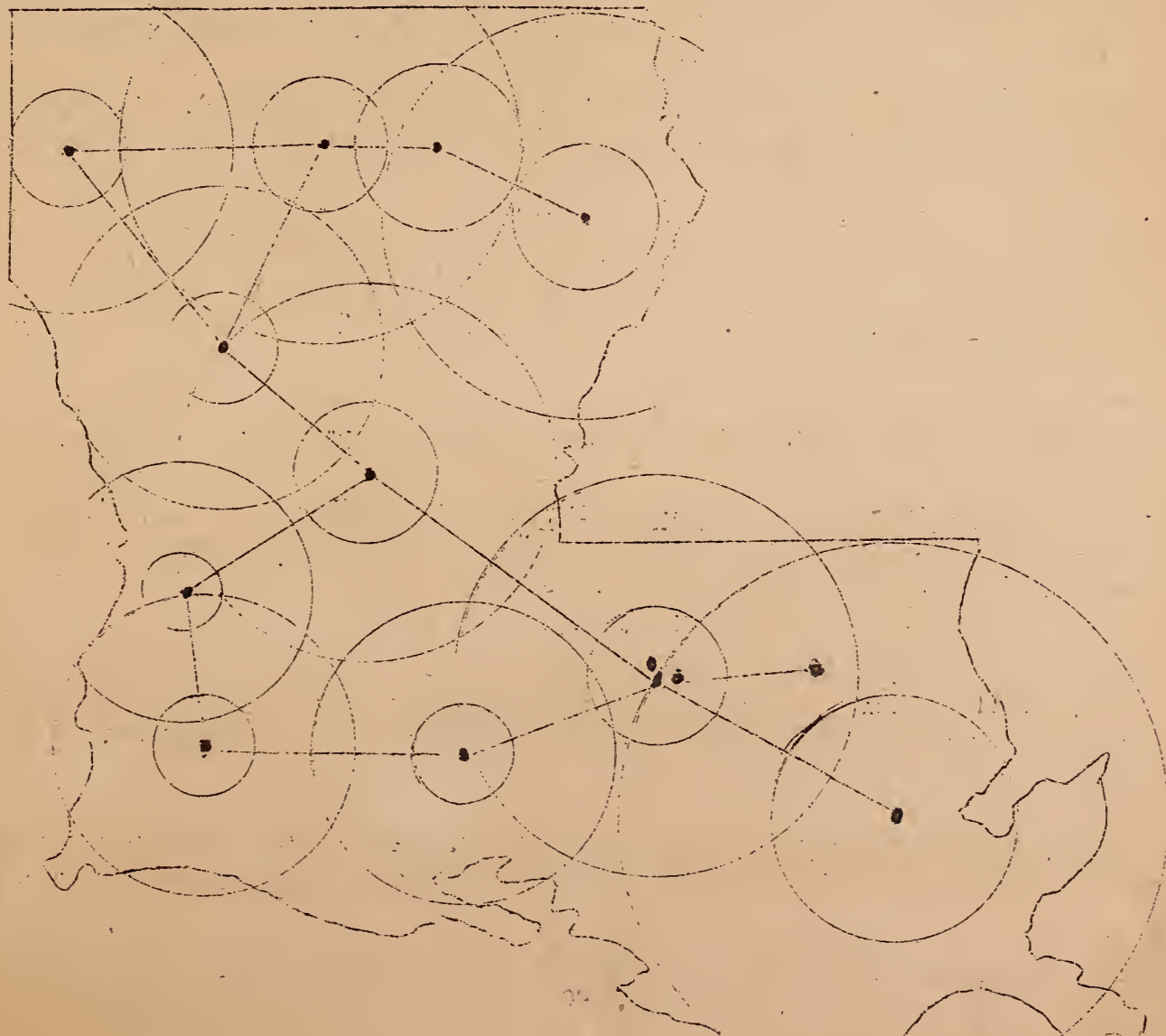
3. By locating broadcast stations in overlapping zones. An FM station, besides broadcasting its own programs, can also relay other broadcasts picked up from nearby stations. FM broadcast stations, like relay stations, can keep on rebroadcasting a program clear across the country, provided no link in the chain is broken. Reception from the last station rebroadcasting will be just as good as from the first station.

In addition to these three methods for gaining broad coverage, Westinghouse has announced a plan for nation-wide broadcasts from 8 planes flying in slow circles at about 30,000 feet. Applications are now on file with the Federal Communications Commission.

Of the three usual ways of building FM networks, the most economical is to locate broadcast stations so that they can rebroadcast from one to another. This saves considerable expense of constructing or leasing transmission lines or relay stations.

To blanket an area with stations in overlapping zones requires on the average one station for each 7,500 square miles, but it depends on many different factors, including: Transmitter power, antenna height, antenna gain, land contour, and population congestion.

By way of example, the map which follows was prepared by the U. S. Office of Education to show how a network of 11 stations can reach every school and home in Louisiana, with programs originating in the principal educational institutions, and with broadcast zones overlapping so that these stations can exchange their programs at will.



Cost Of Building An FM Station Is Low

The total cost of building an FM station varies from about \$20,000 to as much as \$150,000 with an average close to \$60,000.

In contrast, it takes hundreds of thousands of dollars -- or even millions -- to buy an AM station of any size.

The main reason for this difference is the economic principle that scarce things are high and plentiful things low in price.

There are only a little over 900 AM stations in the United States, and overcrowding is apparent from the interference that prevails. Competition for these scarce facilities bids up the price.

In the case of FM, far more stations can be licensed to broadcast -- perhaps 2 or 3 thousand in the United States. In other words most any community can have as many stations as it can support. The same frequencies can be assigned over and over again to other stations serving different areas.

A big cost factor for an AM station is the advertising equity which runs the purchase price far above the value of the property.

But you can build an FM station for the actual cost of the facilities. Then you can get your advertising revenue eventually anyway (if your station is commercial).

Cost Of Operating An FM Station Is Moderate

An FM station can be operated for as little as \$20,000 a year but usually costs upwards of \$50,000. There are ways of cutting costs, especially for educational stations where the schools supply part of the staff and talent. However, two factors tend to raise FM operating expenses:

1. FM broadcasts must be of high quality to achieve the superior results that FM can produce.
2. Because of increased competition, FM stations in order to survive will have to offer better programs.

The cost of operating an FM station can be kept down for three principal reasons:

1. FM's effectiveness in using recordings. Because of FM's superior tone, "canned" music on FM sounds better than "live" music on AM (provided the receivers and the transcriptions are adequate). Music is popular if it is varied with other features, and recordings are inexpensive.
2. FM's suitability for local talent. Because of the limited range of an FM station, local talent will have a special appeal on FM programs, and local talent is low in cost.
3. FM's efficiency in the use of power. An FM station requires only about 1/2500 as much power as an equivalent AM station needs for clear reception.

FM Can Be Brought Into The Home At Low Cost

Many of the 28 million families that now own AM radios will buy new FM-AM sets when they are available. Adding the FM feature to these new radios will increase their cost by only about \$10. For this added price, most people will no doubt prefer FM-AM combinations provided they know about FM and are aware that their radios will soon be obsolete unless they can receive FM.

One prominent radio manufacturer has predicted that 5 million new receiving sets equipped with FM will be sold in the first year of production and expects at least 20 million in five years.

Why FM Can Offer Better Programs

FM programs will have at least four major advantages:

1. More programs.
2. Freedom from noise.
3. Better tone.
4. Local appeal.

Since there will be more FM stations than AM, competition for listeners will be intensified, thus stimulating the improvement of programs. Better programming will take advantage of FM's natural qualities.

People who hear FM's brilliant, clear tone just once are often dissatisfied with their AM radio ever afterwards. People who have FM sets report that they seldom listen to their AM radio at all.

The main reason is that FM is free from the usual disturbances found on AM constantly, such as interference among stations, weather static, fading, and all sorts of noises coming from electric razors, vacuum cleaners, elevators, street cars, etc.

FM's life-like tone is important too, especially for music -- and music is listened to more than anything else on the air. Even on recordings, FM is the nearest thing imaginable to having an orchestra or soloist right in your own home.

Skeptics may say that the average person does not care about quality anyway, but sales experience shows that Americans want the best when they can afford it. Even if it's only to "keep up with the Joneses", most radio owners will want FM when the movement sweeps the country.

Because of the limited range of an individual station, FM can offer a great deal of local color -- local talent, local news, etc. The closer you get to an individual-- his home, his job, his fun, his neighborhood, his friends -- the more you arouse his personal interest.

Each FM station, because it covers a small area, can study its listeners carefully until it knows exactly what will please them most.

In radio, FM has the same advantages as a small town or country paper, which local folks read word for word.

In addition, FM also has the same advantage as the biggest of city newspapers which circulate regionally or nationally.

For FM will bring you network programs as well as local.

In short, FM offers a matchless opportunity for listener appeal which in a few years will surpass the best that AM can produce.

FM QUESTIONS AND ANSWERS

1. How new is FM?

Its scientific principles have been known for a long time, but inventions making possible its use for broadcasting were announced only in 1935 by Major Armstrong, Columbia University professor, who owns most of the basic patents.

The war interrupted sales to civilians, but our armed forces have made great use of FM.

The war has added greatly to research and experience in FM.

2. Is FM still experimental or is it ready for general use?

It's ready for use by everybody. There are no "bugs" in it. Both broadcasting and reception have been fully tested by experience. Of course there will always be gradual improvements, just as in anything else.

3. Are materials now available for FM manufacture?

Yes. All restrictions on radio manufacture were lifted almost immediately after the surrender of Japan.

4. Are licenses being granted to build new FM stations?

Since October 7 the Federal Communications Commission has been taking action on all applications, pending and new.

Of course it will take some time to consider all applications, to hold hearings, issue broadcast licenses and construction permits, etc.

Construction must be completed in 8 months after a permit is granted, unless a valid reason can be shown for delay.

5. How soon will FM get started on a big scale?

Almost immediately. Manufacture is under way. Receiving sets will soon appear in abundance. Applications for stations have been coming to FCC at a rapid rate.

An FM "boom" is expected to keep on gaining speed for at least several years -- with the peak being reached when most American homes will have FM.

It is anticipated that eventually FM ownership will be even greater than AM ownership is today.

6. Will FM replace or compete with AM?

Yes, to a great extent. As more people get FM, listenership is sure to decline for AM. As listeners change over, many AM stations will convert to FM -- especially the smaller and medium-size stations.

The majority of FM applications received by FCC are from AM broadcasters.

Eventually, the AM field may be left largely to a smaller number of very powerful stations, covering broad enough territory to reach the shrinking number of AM listeners scattered in thinly populated areas.

7. Will television replace or compete with FM?

Not in the foreseeable future. Television is highly expensive -- reception, transmission and program production. No way has yet been found to bring television within the financial reach of lower income families. The use of television will be much slower than FM.

To the extent that television is used, it will supplement and not replace FM. Sound programs will naturally be different from sound-visual programs, with different appeals.

For families that can afford it, television will compete with FM, but only in the sense that one form of entertainment always competes with another.

Incidentally, FM and television are closely allied. Both are short-wave (high-frequency) broadcasts. Both have a limited broadcast range. They are close together on the radio spectrum. The sound part of television will be nearly the same as FM.

8. How will the coming of "radio newspapers" affect FM?

Facsimile will in the course of time bring into the home the same things that are in a newspaper, both the print and the pictures.

Facsimile broadcast, like FM and television, is a short-wave (high-frequency) affair.

The Federal Communications Commission has provided for the transmission of facsimile programs by FM sound transmitters.

Thus facsimile, like television, will supplement FM.

When facsimile is ready for general use, the receiving equipment in the home can simply be added.

9. Is FM related to some of the newer Army uses of radio?

Yes. The "walkie-talkie" operates on an FM principle. Radar is also similar.

Much of our military communications will continue to be on an FM basis. So will police systems. However, such uses will be on separate parts of the radio spectrum.

10. Does the Army have surplus FM equipment?

Yes, both broadcasting and receiving equipment, but much of it is not suitable for civilian use.

11. On what part of the dial do you get FM?

In June 1945 the Federal Communications Commission assigned to FM the broadcast band from 88 to 106 megacycles, later extending it to 108 megacycles for some areas. That's the same as 88,000 to 108,000 kilocycles.

In comparison, the regular AM broadcast band is from 550 to 1,600 kilocycles.

Since each FM broadcast requires a channel about 200 kilocycles wide, there are 100 channels available for FM.

Of the total FM band, 20 channels (from 88 to 92 megacycles) are assigned to non-commercial educational stations. The remaining 80 channels are for commercial stations, with 10 of these channels shared between FM and facsimile (from 106 to 108 megacycles).

12. Must existing FM stations and sets be converted to the new FM band?

Yes. The FM band being used now is from 42 to 50 megacycles. Transmitters will have to start using the new broadcast band by a given date to be announced by the Federal Communications Commission.

All FM sets made after the end of the war will be on the new band, from 88 to 108 megacycles.

Manufacturers are now moving into production with assurance that the position of FM on the radio spectrum is permanent.

13. Will FM operate on batteries as well as on electric power?

Yes. FM can be used on farms that are without a power supply. It can also be used in automobiles.

14. What kind of staff do you need to operate an FM station?

At least two people must be on the job during broadcasts -- one to announce and one at the controls. (It takes two control operators if the studio and transmitter are in different places.) There should be a secretary to meet callers, answer the phone, type, file, etc. Someone has to arrange the programs and write the continuity (sometimes also scripts). If it is a commercial station, someone has to sell ads and sometimes write them. A certain amount of publicity is needed too. Those who handle such functions can take turns at announcing or even at the controls (if they are licensed operators).

The above are only minimum essentials. Larger staffs are common in commercial broadcasting.

15. How high are the salaries of a station's staff?

The U. S. Office of Education indicates the following for essential personnel in educational stations (for each 8 hours of broadcasting):

Manager and Production Director.....	\$2,500 - \$4,500
Radio Engineer.....	\$2,500 - \$3,500
Receptionist and Clerk.....	\$1,200 - \$2,000
	<u>\$6,200 - \$10,000</u>

Commercial stations employ more people and pay higher salaries than the above.

16. How much advertising revenue can an FM station expect?

It is difficult to estimate the advertising possibilities of FM because few of the 47 stations now in operation sell ads. However, there is a rule of thumb in radio which says that a station's profits run about a dollar per listener per year -- which would mean \$100,000 for a station whose service area contained 100,000 listeners. There are some low-powered AM stations (about 250 watts) that gross over \$100,000 per year. For all AM stations and networks in 1944 the average advertising revenue was \$281,000 per station.

17. Will an FM station have trouble selling advertising at first?

The few FM stations now selling ads do not seem to be having much trouble. However, most of a station's ads will be local until FM networks are built up. For an FM station starting out in a new area where there are few receiving sets equipped with FM, it may take close to two years before its advertising revenues are enough to support the station completely.

18. How much does it cost to relay FM broadcasts?

If transmission wires are used, the rates for leasing will probably run around \$8 per mile per month.

If relay stations are used, the cost of construction will be about \$6,000. On a per mile basis, that would be about \$200 to build plus about \$45 to \$75 annually for upkeep. (Relay stations can be run without an operator, requiring only occasional inspection.)

If broadcast stations are located in overlapping zones so that they form a network, they can broadcast from one to another at no added cost.

19. Can an FM station relay one program and broadcast another at the same time?

Yes, provided it has both a relay transmitter and a broadcast transmitter. The relaying will be done on frequencies above the FM band. At the same time the station can broadcast on its own frequency.

However, a station cannot broadcast more than one program at a time. It is assigned only one frequency for broadcasting.

A station which is part of a network can choose between broadcasting a program originating in its own studio or broadcasting a program beamed from some other station.

20. How many FM stations are there and where are they located?

There are 47 stations in operation, 670 construction permits applied for, and many more inquiries received by the Federal Communications Commission asking how to apply or get started.

A list of FM stations is attached.

21. How many FM receiving sets are there and where are they?

Only about 400,000 pre-war receiving sets equipped with FM were sold. However, there has been no real impetus to the sale of FM sets because (1) FM got started only a few years before the war, (2) the war interrupted manufacture for civilians, (3) there are few FM stations. Now FM is all set to go on a mass production basis. One manufacturer estimates that 5 million sets having FM will be sold in a year and at least 20 million in five years.

22. What are the best market areas for FM stations and receiving sets?

The starting of new FM stations and the sale of receiving sets must and will proceed together of course. The best customers for FM are the more than 28 million families that own AM sets -- representing about 85% of the population, 95% of urban families and 75% of rural families (estimated at present).

The number and percentage of homes owning radio sets, according to the 1940 census, was distributed by states and regions as shown on the attached table.

23. What are the best places to locate FM stations?

Roughly, the number of people that can be reached by FM depends on the distribution of population.

The United States has nearly 100 metropolitan centers plus more than 600 additional cities over 10,000 in population -- and about 580 of the latter do not have AM stations.

Nearly 57 percent of the country's area containing 21 million people has no primary nighttime service from any AM station.

Population tables and maps, obtainable from the U. S. Census Bureau, are helpful in planning for FM stations.

24. Do educational FM stations have special advantages?

Yes. Major Armstrong, Columbia University Professor who owns most of the basic FM patents, offers his inventions to educational institutions at a nominal royalty of \$1 per year. The Federal Communications Commission has assigned a separate part of the FM broadcast band (20 channels from 88 to 92 megacycles) to educational stations. The U. S. Office of Education gives special planning assistance to educational institutions interested in FM.

FCC has warned educational institutions that they must use the assigned channels or else face the prospect of having them re-assigned in the course of time.

Statewide systems of educational stations are being planned in 34 states containing 85 percent of the U. S. population. FCC has about 30 applications for educational stations.

25. Are there any special regulations governing FM stations?

Yes. FCC rules for FM may be obtained by writing to the Federal Communications Commission, Washington, D. C.

One set of regulations governs the classification of FM stations as rural, metropolitan or community.

Another rule is that nobody can own more than 6 FM broadcast stations.

26. Do you need to hire a lawyer or radio engineer to get an FM station started?

Yes, unless you already have such aid available.

It will pay in the long run to employ an FM radio engineer before you fill out an application. Most of the planning has to be done before you can supply all the data required on the application.

You need a radio engineer (1) to plan a station or network, (2) to draw up detailed specifications for equipment, (3) to supervise the letting of bids, (4) to prepare engineering data for broadcast licenses and construction permits, (5) to supervise construction, (6) to check performance.

Pre-application engineering services and preparing the application will cost from \$300 to \$1,000. Complete engineering services can be figured at about 5% of a station's cost.

Legal services will be needed to option, lease or buy sites; to draw up contracts for buying equipment; to complete and service applications for licenses.

HOMES OWNING RADIOS, 1940 CENSUS

UNITED STATES REGION AND STATE	TOTAL		URBAN		RURAL-NONFARM		FARM	
	Number	%	Number	%	Number	%	Number	%
<u>New England</u>								
Maine	184,348	86.5	80,245	93.2	73,856	84.0	30,247	77.2
New Hampshire	116,809	90.0	68,636	93.3	35,236	86.9	12,937	82.9
Vermont	80,253	88.6	30,404	95.5	30,213	87.6	19,636	80.9
Massachusetts	1,044,830	96.2	938,394	96.6	85,934	93.5	20,502	89.3
Rhode Island	176,739	95.7	161,891	96.1	12,604	92.6	2,244	88.2
Connecticut	417,259	95.7	285,058	96.4	111,445	95.3	20,746	88.5
<u>Middle Atlantic</u>								
New York	3,385,620	95.5	2,854,232	96.7	381,345	92.4	150,043	83.8
New Jersey	1,020,466	95.5	840,052	96.2	152,297	93.2	28,117	87.6
Pennsylvania	2,255,921	92.4	1,590,171	95.5	517,702	88.7	158,048	77.3
<u>E. N. Central</u>								
Ohio	1,697,672	91.7	1,196,724	95.1	290,910	87.8	210,038	80.2
Indiana	826,604	88.2	491,706	93.5	173,928	85.6	160,970	77.5
Illinois	1,974,604	92.3	1,517,570	95.3	261,420	86.3	195,614	80.4
Michigan	1,271,499	93.4	868,839	96.4	224,307	90.9	178,353	83.7
Wisconsin	743,078	91.7	437,682	96.5	140,321	88.9	165,075	83.0
<u>W. N. Central</u>								
Minnesota	647,499	91.2	357,752	95.8	115,860	87.4	173,887	85.3
Iowa	617,006	90.2	284,354	93.7	138,016	87.6	194,636	87.3
Missouri	832,590	79.9	507,394	90.8	153,707	76.8	171,489	60.5
North Dakota	131,000	88.4	31,374	94.6	39,396	85.7	60,230	87.2
South Dakota	136,049	84.6	39,191	92.5	39,408	81.8	57,450	81.7
Nebraska	298,790	84.7	132,428	92.7	72,446	82.9	93,916	76.7
Kansas	411,984	83.0	196,458	90.4	102,849	82.4	112,677	73.2
<u>South Atlantic</u>								
Delaware	59,921	87.0	33,331	92.3	18,513	86.5	8,077	71.1
Maryland	396,338	88.1	258,172	93.4	101,547	84.4	36,619	68.7
Dist. of Columbia	158,377	93.7	158,377	93.7	-	-	-	-
Virginia	409,978	67.1	199,670	84.0	114,756	67.6	95,552	46.9
West Virginia	326,347	75.1	122,709	89.7	142,190	75.4	61,448	56.4
North Carolina	471,863	61.8	180,456	77.7	142,468	67.6	148,939	46.4
South Carolina	209,542	49.6	80,519	67.1	73,498	60.0	55,525	30.9
Georgia	381,668	52.5	190,326	68.2	95,144	57.6	96,198	34.0
Florida	326,447	64.8	217,044	76.1	81,444	55.1	27,959	39.4
<u>E. S. Central</u>								
Kentucky	444,416	65.3	194,564	84.0	115,079	65.7	134,773	49.3
Tennessee	434,733	62.5	208,148	77.7	96,620	65.1	129,965	46.6
Alabama	321,671	49.4	152,650	69.7	82,906	54.5	86,115	30.8
Mississippi	205,613	39.9	71,289	61.5	47,177	50.9	87,147	28.4

W. S. Central

Arkansas	244,586	50.9	86,598	72.4	58,001	53.7	99,987	39.5
Louisiana	307,883	53.3	186,913	72.6	69,626	52.5	51,344	27.3
Oklahoma	405,754	68.8	204,412	83.5	87,273	64.6	114,069	54.4
Texas	1,090,206	66.9	512,717	78.6	229,426	65.7	248,063	49.4

Mountain

Montana	134,503	86.2	57,114	91.3	40,924	84.4	36,465	88.1
Idaho	118,824	86.4	44,795	91.3	33,697	84.1	40,332	83.3
Wyoming	57,126	84.4	24,489	91.5	18,603	83.2	14,034	75.7
Colorado	258,573	84.5	154,155	91.5	59,231	78.1	45,187	73.5
New Mexico	66,609	53.2	32,680	72.5	19,824	47.6	14,105	36.7
Arizona	87,781	69.0	39,234	82.4	37,508	69.3	11,039	43.3
Utah	126,418	92.4	76,243	95.0	32,771	90.2	17,404	86.3
Nevada	26,200	81.4	11,405	89.2	11,889	77.4	2,906	72.0

Pacific

Washington	472,553	90.6	271,292	92.7	122,923	89.2	78,338	85.8
Oregon	290,641	88.7	155,810	93.1	77,496	86.1	57,335	81.4
California	1,933,028	92.9	1,450,444	95.1	338,996	88.5	143,588	84.1

STATIONS USING FM
(October 22, 1945)

STATE AND CITY	CALL LETTERS	FREQUENCY
<u>ALABAMA</u>		
Birmingham* <u>3</u> /	W4XAP	To be assigned
Birmingham* <u>3</u> /	W4XFM	To be assigned
<u>CALIFORNIA</u>		
Los Angeles <u>1</u> /	KEJ-FM	44.5
Los Angeles* <u>1</u> /	KTLO	46.1
Los Angeles* <u>2</u> /	KUSC	42.9
San Francisco <u>2</u> /	KALW	42.1
<u>COLORADO</u>		
Denver <u>3</u> /	W9XLA	43,500 or other to be assigned
Area of Denver <u>3</u> /	W9XLA	43,500 or other to be assigned Satellite with W9XLA
<u>CONNECTICUT</u>		
Hartford <u>1</u> /	WTIC-FM	45.3
Hartford <u>1</u> /	WDRC-FM	46.5
<u>DISTRICT OF COLUMBIA</u>		
Washington, D. C.* <u>3</u> /	W3XL	To be assigned
Washington, D. C. <u>3</u> /	W3XO	To be assigned
<u>GEORGIA</u>		
Atlanta (Portable) <u>3</u> /	W4XAJ	To be assigned
Atlanta* <u>3</u> /	W4XAG	To be assigned
<u>ILLINOIS</u>		
Chicago <u>1</u> /	WBBM-FM	46.7
Chicago <u>1</u> /	WDLN	47.5
Chicago <u>1</u> /	WGNC	45.9
Chicago <u>1</u> /	WEHS	48.3
Chicago <u>1</u> /	WWZR	45.1
Chicago* <u>3</u> /	W9XJD	To be assigned
Chicago <u>2</u> /	WBEZ	42.5
Urbana <u>2</u> /	WIUC	42.9

INDIANA

Evansville 1/
Port Wayne 1/
Glenwood* 3/
Indianapolis 1/
South Bend 1/

WMIL 44.5
WOWO-FM 44.9
W9XEV To be assigned
WABW 47.3
WSBF 47.1

IOWA

Iowa City* 2/

KSUI 42.7

KENTUCKY

Eastwood 3/
Lexington 2/

W9XEK 45.5 or other
WBKY 42.9

LOUISIANA

Baton Rouge 1/

WBRL 44.5

MARYLAND

Baltimore 3/

W3KMB To be assigned

MASSACHUSETTS

Boston 1/
Boston 1/
Boston 1/
Cambridge* 3/
Framingham* 3/
Springfield 1/
Worcester 1/

WBZ-FM 46.7
WMTW 43.9
WGTR 44.3
WLXHR To be assigned
WLXMR To be assigned
WBZA-FM 48.1
WTAG-FM 46.1

MICHIGAN

Ann Arbor* 2/
Detroit 1/
Detroit 1/

WATX 42.1
WLOU 44.9
WENA 44.5

MISSOURI

Kansas City 1/
Kansas City 1/
Kansas City* 2/

KOZY 44.9
KMBC-FM 46.5
KICR To be assigned

NEW JERSEY

Alpine 1/
Alpine 4/
Jersey City* 1/
Jersey City* 3/
Newark 2/

WFEN 43.1
W2XEN 42800
WAAW 49.5
W2XJC To be assigned
WBGO To be assigned

NEW YORK

Binghamton <u>1</u> /	WNBF-FM	44.9
Brooklyn <u>2</u> /	WNYE	42.1
Buffalo* <u>2</u> /	WCAH	42.9
New York <u>1</u> /	WBAM	47.1
New York <u>1</u> /	WNYC-FM	43.9
New York <u>1</u> /	WABC-FM	46.7
New York* <u>1</u> /	WFGG	45.5
New York <u>1</u> /	WQXQ	45.9
New York <u>1</u> /	WHNF	46.3
New York <u>1</u> /	WABF	47.5
New York <u>1</u> /	WGYN	44.7
New York <u>1</u> /	WEAF-FM	45.1
New York* <u>3</u> /	W2XMC	117.650
New York* <u>3</u> /	W2XRA	To be assigned
New York* <u>3</u> /	W2XRY	To be assigned
Rochester <u>1</u> /	WHFM	45.1
Rochester <u>1</u> /	WHEF	44.7
Schenectady <u>1</u> /	WBCA	44.7
Schenectady <u>1</u> /	WGEM	48.5

NORTH CAROLINA

Winston-Salem <u>1</u> /	WMIT	44.1
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OHIO

Cincinnati <u>3</u> /	W8XFM	To be assigned
Cleveland <u>2</u> /	WBOE	42.5
Columbus <u>1</u> /	WELD	44.5
Dayton (Portable)* <u>3</u> /	W8XIV	To be assigned

OREGON

Portland* <u>3</u> /	W7XFE	To be assigned
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PENNSYLVANIA

Philadelphia <u>1</u> /	WPEN-FM	47.3
Philadelphia <u>1</u> /	WIP-FM	44.9
Philadelphia* <u>1</u> /	WIBC-FM	46.5
Philadelphia <u>1</u> /	WCAU-FM	46.9
Philadelphia <u>1</u> /	KYW-FM	45.7
Philadelphia <u>1</u> /	WFIL-FM	45.3
Pittsburgh <u>1</u> /	KDKA-FM	47.5
Pittsburgh <u>1</u> /	WTNT	44.7

TENNESSEE

Chattanooga* <u>3</u> /	W4XCT	To be assigned
Nashville <u>1</u> /	WSM-FM	44.7

TEXAS

Dallas (Portable)* 3/

W5XIC

To be assigned

UTAH

Salt Lake City* 1/

KSL-FM

44.7

WISCONSIN

Milwaukee 1/

WMFM

45.5

Milwaukee 3/

W9XJC

45,500

Richfield* 3/

W9XX

To be assigned

Superior 1/

WDUL

44.5

*Construction permit granted. Not in operation.

1/ Commercial FM

2/ Educational

3/ Developmental

4/ Experimental